Vol. 18 October 1942 No. 10

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS
from
TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noted.)

Study of the Insecticidal Principle in the Smoke Produced by Combusting Insect Powder. (Part IX.)

(pp. 935~939)

By Makoto NAGASE.

(The Institute of Physical and Chemical Research;
Received May 25, 1942.)

Studies on the Yeasts Found in "Miso."

(pp. 940~944)

By Masatoshi MOGI.

(The Brewing Laboratory, Noda Syōyu Co. Ltd., Tiba-ken;
Received June 11, 1942.)

On the Manufacture of Acetone and Butanol by Fermentation. (5).

(pp. 945~954)

By H. OKEDA, N. SOWA, A. WATANABE, and Y. HASHIMOTO.

(Nippon Soda Co. Ltd.;
Received February 23, 1942.)

Studies on Acetone-Butylalcohol Fermentation. IV.

Accessory Factors for Growth and Fermentation. (1).

(pp. 955~960)

By Sigeyosi HORIE.

(Agricultural Chemical Laboratory, Kyūsyū Imperial University,
Fukuoka, Nippon; Received June 17, 1942.)

Untersuchungen über die Saccharase von Zuckerrohr. I. Mitteilung.

Über die Saccharase in den Blättern des Zuckerrohrs.

(SS. 961~964)

Von Minoru FUJII.

(Aus dem Institut für Zuckerforschung in Tainan:
Eingegangen am 25. Mai 1942.)

Grundlegende Untersuchungen über die Fixierung des Sericins. (7 Mitteilung)

(SS. 965~971)

Von Ziro HIROSE.

(Aus dem Insititut für Seidenbau, der Aktiengesellschaft, Gunze-Seisi,
zu Ayabe, Kyotofu: Eingegangen am 13. 4. 1942.)

The Influence of Steam-heating Process upon the Water Soluble Protein in Soya Bean in the Round Cake Pressing Method.

(pp. 972~974)

By Rishichi TANAKA.

(The Central Laboratory, South Manchuria Railway Co., Dairen;
Received June 15, 1942.)

Über die Synthese von α-Naphthylessigsäure.

(pp. 975~980)

Von Teijiro YABUTA, Kinjiro TAMARI, Sinji MITSUNAGA
und Toschihide KUNIMUNE.

(Landwirtschaftliches Chemisches Laboratorium der Kaiserl. Universität zu Tokyo:
Eingegangen am 15. 6. 1942.)

On Inulinase, Amylase, and Urease in Yeast.

(pp. 981～986)

By Motoyoshi Hongo.

(Agr. Chem. Laboratory, Faculty of Agr., Tokyo Imperial University;
Received June 17, 1942.)

Butyric Acid Fermentation. (II).

(pp. 987～994)

By Toshinobu Asai and Eitaro Komatsu

(Agricultural Chemical Laboratory, Tokyo Imperial University; Received June 19, 1942.)

Chemical Studies on the Tyōsen Cattle. (Part 1).

On Physical and Chemical Properties of the Body Fat of Fattened Tyōsen Cows.

(pp. 995～1007)

By Norihide Ando.

(College of Agriculture and Forestry, Suigen, Tyōsen; Received June 1, 1942.)

In the present fattening experiment twenty-four cows of Tyosen native breed of about six years of age were divided into two dietary groups of barley and sweet potato, each group consisting of four lots receiving different amounts of soybean oil cake: Lot I receiving no soybean oil cake, Lot II receiving four per cent, Lot III nine per cent, and Lot IV twenty per cent of soy bean oil cake.

At the end of the fattening experiment fifteen of all the fattened cows were selected and slaughtered to take their body fat samples, of which physical and chemical properties were studied.

The experimental results are as follows:

Table I. Buttocks Hypodermic Fat

Group	Lot	Melting Point	Acid Value	Saponification Value	Iodine Value
Barley Group	I	43.0°C	10.17	198.3	45.36
	II	38.5	9.92	198.0	51.52
	III	40.8	9.95	197.5	48.56
	IV	42.5	11.00	197.8	45.16
	Mean	41.1	10.00	197.8	47.83
Sweet Potato Group	I	39.5	14.03	196.4	51.60
	II	40.5	9.91	199.5	46.84
	III	41.3	9.38	199.6	49.05
	IV	39.3	10.21	201.4	50.79
	Mean	40.1	10.72	199.5	50.32

Table II. Kidney Fat

Group	Lot	Melting Point	Acid Value	Saponification Value	Iodine Value
Barley Group	I	51.0°C	14.36	199.8	30.01
	II	49.5	18.60	200.1	34.04
	III	50.5	15.78	200.0	30.66
	IV	49.5	11.31	199.8	32.12
	Mean	50.2	15.17	199.9	31.50
Sweet Potato Group	I	50.0°C	12.37	197.6	34.70
	II	50.2	20.47	195.8	32.30
	III	48.8	16.71	197.8	34.18
	IV	49.8	16.58	200.9	33.36
	Mean	49.8	16.92	198.1	33.47

The results indicate that the different fodders and the amount of soybean oil cake added have no distinct effects on physical and chemical properties of buttocks hypodermic and kidney fats, and the author's results are nearly the same as those of previous workers.

Furthermore, some biometrical constants of all the samples were studied by the author and tabulated as follows:

Table III. Mean Value, Standard Deviation, Coefficient of Variability.

	Mean Value		Standard Deviation		Coefficient of Variability	
	Hypodermic Fat	Kidney Fat	Hypodermic Fat	Kidney Fat	Hypodermic Fat	Kidney Fat
Melting Point	40.70±0.27	50.17±0.19	1.558±0.192	1.075±0.132	3.83±0.47	2.14±0.26
Acid Value	10.57±0.32	16.34±0.64	1.844±0.227	3.698±0.455	17.45±2.49	22.63±3.34
Saponification Value	198.74±0.46	198.54±0.37	2.626±0.323	2.136±0.263	1.32±0.16	1.08±0.13
Iodine Value	49.63±0.39	32.80±0.40	2.214±0.272	2.315±0.285	4.46±0.52	7.06±0.87

According to the results of statistical researches(a) there are a slight positive correlation between H_M and K_M, a middling positive correlation between H_I and K_I, a heavy negative correlation between H_M and H_I, and also a heavy negative correlation between K_M and K_I. But in all other cases no correlation has been observed. The four cases are tabulated as follows:

(a) H_M : Melting Point of Hypodermic Fat
H_I : Iodine Value of Hypodermic Fat
K_M : Melting Point of Kidney Fat
K_I : Iodine Value of Kidney Fat

Table IV. Correlation Coefficient and Regression Coefficient.

Between	Correlation Coefficient (r)	Regression Coefficient (R)	
H_M and K_M	+0.48±0.13	$R_{\frac{H_M}{K_M}}$	$R_{\frac{\ M}{H_M}}$
		+0.070±0.22	+0.33±0.11
H_I and K_I	+0.68±0.09	$R_{\frac{H_I}{K_I}}$	$R_{\frac{K_I}{H_I}}$
		+0.65±0.12	+0.71±0.13
H_M and H_I	−0.82±0.06	$R_{\frac{H_M}{H_I}}$	$R_{\frac{H_I}{H_M}}$
		−0.57±0.07	−1.16±0.14
K_M and K_I	−0.80±0.06	$R_{\frac{K_M}{K_I}}$	$R_{\frac{K_I}{K_M}}$
		−0.37±0.05	−1.72±0·22

Untersuchung über die Synthesen der Phosphatiden und ihrer verwandten Verbindungen. Mitteilung III.

Darstellung des Trimethylaminhydrochlorides.

(SS. 1008∼1009)

Von Yataro Obata.

(Aus dem Agrikulturchem. Laboratorium, Kaiserl. Universität, Tokio;
Eingegangen am 20. 6. 1942.)

Untersuchungen über die Synthesen der Phosphatiden und ihre verwandten Verbindungen. Mitt. IV.

Synthese von β-Bromcholinsalz.

(SS. 1010∼1012)

Von Yataro Obata.

(Aus dem Agrikulturchem. Laboratorium, Kaiserl. Universität, Tokio;
Eingegangen am 20. 6. 1942.)

On the Estimation of Vitamin B$_2$

(pp. 1013～1021)

By T. KOYANAGI, O. HUJII, and Bukiti KIKUTI.

(Agricultural Chemical Laboratory, Tokyo Imperial University;
Received June 30, 1942.)

Studies on the Manufacture of Organic Acids.
(Parts 1～2)

(pp. 1022～1028)

By Y. INOUYE, M. HAMADA, H. KAMEDA, and E. INOUYE.

(Biochemical Laboratory, Department of Agriculture, Kyoto Imperial University, and Sankyo Company, Osaka Factory;
Received April 5, 1942.)

Part 1. Formation of Malic Acid from Maleic Acid.

For the purposes of the confirmation of the reaction mechanism and the increasing of the yield in the formation of malic acid from maleic acid, the authors repeated several experiments, by which it was shown that, as Weiss and Down reported, at the lower temperature an equilibrium exists among maleic, fumaric, and malic acids, while at the higher temperature the equilibrium is between fumaric and malic acids in spite of starting with maleic acid.

And at the same time many compounds were tested as catalysts for the formation of malic acid and it was found that when aluminium oxide was used as catalyst, the condition of reaction being temp. 160°C, pressure 85 lbs per sq. inches, reaction time 8 hrs. and 50 cc of water to 10 g of maleic acid, the yield of malic acid was 80.8% which was the best.

Part 2. Transformation of Maleic Acid to Fumaric Acid.

Many catalysers were investigated under the condition of atmospheric pressure for the transformation of aqueous maleic acid solution to fumaric acid, and it was concluded that potassium rhodanate was the best catalyst.

For instance, the yield attained to 93% when 60 g of maleic acid and 2 g of potassium rhodanate were dissolved in 100 cc of water and boiled for about 2.5 hours.

Studies on the Manufacture of Organic Acids. Part 3.

Fumaric Acid from Furfural.

(pp. 1029∼1032)

By Y. INOUYE, M. HAMADA, and S. ITO.

(Biochemical Laboratory, Department of Agriculture, Kyoto Imperial University, and Sankyo Co., Osaka Factory; Received May 25, 1942.)

In the authors' laboratory, Dr. Takahashi already obtained a patent (Japanese Pat. 137755) for manufacturing fumaric acid, using furfural as raw material and aqueous sodium chlorate solution as oxidizing agent in the presence of manganese dioxide and a minor quantity of vanadium pentoxide. This process may be more efficient than any other method. It is, however, of some danger to have a great deal of crystalline $NaClO_3$ in stock in the factory for industrial purpose, because of its liability to spontaneous explosion, and at the same time the concentration of chlorate solution to be employed in this process is not so low. Therefore, in the present work, the authors attempted to modify the above method by means of continuous preparing of diluted $NaClO_3$ solution by electrolysis of NaCl solution, using graphite and iron plates as electrodes, into which, when the concentration of $NaClO_3$ produced amounted to about 9%, furfural was added in drops and well stirred in the presence of the catalysts, being acidified with HCl and warmed up to 90°C. It may be considered that electrolytic oxidation would also take place in this condition. The total consumption of furfural was identified by aniline acetate test. As fumaric acid is sparingly soluble in cold water, the crops were gathered by cooling, after separating off the catalysts through filter, and then the mother liquor was refined with alkali, by which the dissolved manganese compounds were taken off, and could be used repeatedly as electrolyte. The yield of fumaric acid in repeated utilization of electrolyte may, under the conditions described below, be seen in the following table.

Steps.	Yield to furfural added, %	Steps.	Yield to furfural added, %
1	51	6	52
2	30	7	77
3	32	8	66
4	35	9	68
5	54		

Experiments were always carried out in 1 litre porcelain cylinder, starting with 500 g. of electrolyte, and employing graphite anode of 140 square cm. and iron cathode of 78 square cm. Factors which affect the electrolysis and the subsequent oxidation process for the present research were severally investigated one by one and it was shown, in conclusion, that the best case was as follows; starting with 500 g. of 30% NaCl solution with 3 cc of 30% HCl and 1 g of $K_2Cr_2O_7$ which would prevent the reduction of ClO', current density being 15 amp. per square dm., and voltage being 4∼5 volt at temperature of 70–80°C. It may contain about 9% $NaClO_3$ in the electrolyte after 12 hours, when 10 g of MnO_2

and 0.05 g V_2O_5 are well mixed with the solution and from separating funnels, each 30 cc of furfural and 30% HCl being added in drops at the rate of 0.5 g per min., temperature being raised to 90°C under the constant electric current. Subsequent procedure is as described and the yield of fumaric acid may attain 70–80%.